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EXAMINER	
THOMPSON, JAMES A	

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2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/772,664	OHASHI, KAZUHITO	
	Examiner	Art Unit	
	James A Thompson	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- *Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.*
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). *Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment.* See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-86* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-86* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 January 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement filed 20 May 2004 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Drawings

3. Figures 24, 25, 26 and 27 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Prelude to Prior Art Rejections

4. Claims 1-16 disclose an image sensing apparatus. Claims 17-32 disclose an image sensing method. The apparatus of claims 1-16 perform, respectively, the method of claims 17-32. Claims 1-16 are therefore discussed respectively with claims 17-32. Claim 33 is a computer program product that performs the method of claim 17 and is therefore discussed along with claims 1 and 17.

Claim 34 discloses an image sensing apparatus. Claim 35 discloses an image sensing method. Claim 36 discloses a computer program product. The apparatus of claim 34 performs the method of claim 35 and the steps of the computer program product of claim 36. Claims 34-36 are therefore discussed together.

Claims 37-60 disclose an image sensing apparatus. Claims 62-85 disclose an image sensing method. The apparatus of claims 37-60 perform, respectively, the method of claims 62-85. Claims 37-60 are therefore discussed respectively with claims 62-85. Claim 86 is a computer program product that performs the method of claim 62 and is therefore discussed along with claims 37 and 62.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-3, 7, 9-11, 13-14, 17-19, 23, 25-27, 29-30 and 33-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto (US Patent 5,371,613) in view of Orito (US Patent 6,072,912).

Regarding claims 1, 17 and 33: Arimoto discloses an image sensing apparatus (figure 2 of Arimoto). Figure 1 and figure 3 of Arimoto show further details of said apparatus (column 3, lines 3-5 and lines 8-10 of Arimoto).

Said apparatus comprises an image sensor (figure 1(210) of Arimoto) which outputs image signals (column 4, lines 56-58 of Arimoto) of a plurality of photoreceptive pixels (CCD) from an output terminal (column 4, lines 53-56 of Arimoto).

Said apparatus further comprises a control unit (figure 1(106(portion)) of Arimoto) for controlling to read a reference density member (figure 3(301P) and column 8, lines 59-67 of Arimoto) having a predetermined density of half tone (column 6, lines 42-43 of Arimoto). The control unit corresponds to the portion of the CPU, along with the corresponding embodied computer routines, that performs the functions of said control unit.

Said apparatus further comprises an adjustment unit (figure 1(106(portion)) of Arimoto) for adjusting levels of the image signals output by said output terminal (column 9, lines 35-40 of Arimoto) so as to substantially correspond to a level of a predetermined reference signal (column 9, lines 52-56 and column 10, lines 1-4 of Arimoto) based on data obtained by reading said reference density member by said image sensor (column 7, lines 31-36 of Arimoto). The adjustment unit corresponds to the portion of the CPU,

along with the corresponding embodied computer routines, that performs the functions of said adjustment unit.

Further regarding claim 33, Arimoto discloses that the operations of said apparatus are performed using computer-readable program code (column 5, lines 20-23 of Arimoto).

Arimoto does not disclose expressly that said image sensor separately outputs image signals of a plurality of divided areas of said plurality of photoreceptive pixels from a plurality of output terminals corresponds to the plurality of divided areas.

Orito discloses separately outputting image signals of a plurality of divided areas (figure 8; figure 9; and column 6, lines 29-35 of Orito) of said plurality of photoreceptive pixels (column 5, lines 50-52 and lines 61-65 of Orito) from a plurality of output terminals corresponding to the plurality of divided areas (column 8, lines 48-53 of Orito). Image signals are placed in memory based on the particular block to which said signals correspond (column 8, lines 48-53 of Orito). In order to access said signals placed in memory, some form of output terminal is required. Since memory corresponding to a particular block of image data is accessed (column 8, lines 48-53 of Orito), said output terminals would therefore correspond to their associated divided area of the image.

Arimoto and Orito are combinable because they are from the same field of endeavor, namely scanned digital tone data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to process and adjust the image data based on said reference member, as taught by Arimoto, for each of a plurality of divided areas of an image, as taught by Orito. The motivation for doing so

would have been that each of a plurality of CCDs (column 1, lines 54-57 of Orito) has different electronic characteristics (column 1, lines 62-63 of Orito) and even a single CCD can produce different tone data values when the irradiation light intensity varies (column 1, lines 63-65 of Orito). Therefore, it is beneficial to obtain correction data from a plurality of divided areas (column 2, lines 21-23 of Orito). Therefore, it would have been obvious to combine Orito with Arimoto to obtain the invention as specified in claims 1, 17 and 33.

Regarding claims 34, 35 and 36: Arimoto discloses an image sensing apparatus (figure 2 of Arimoto). Figure 1 and figure 3 of Arimoto show further details of said apparatus (column 3, lines 3-5 and lines 8-10 of Arimoto).

Said apparatus further comprises an adjustment unit for adjusting levels of the image signals output from said output terminals so as to substantially match to a level of a predetermined reference signal.

Said apparatus comprises an image sensor (figure 1(210) of Arimoto) which outputs image signals (column 4, lines 56-58 of Arimoto) of a plurality of photoreceptive pixels (CCD) from an output terminal (column 4, lines 53-56 of Arimoto).

Said apparatus further comprises a shading correction unit (figure 1(112') of Arimoto) for applying shading correction to the image signals (column 5, lines 29-33 of Arimoto).

Said apparatus further comprises an adjustment unit (figure 1(106) of Arimoto) for adjusting levels of the image signals output by said output terminal (column 9, lines

35-40 of Arimoto) so as to substantially match to a level of a predetermined reference signal (column 9, lines 52-56 and column 10, lines 1-4 of Arimoto).

Further regarding claim 36, Arimoto discloses that the operations of said apparatus are performed using computer-readable program code (column 5, lines 20-23 of Arimoto).

Arimoto does not disclose expressly that said image sensor separately outputs image signals of a plurality of divided areas of said plurality of photoreceptive pixels from a plurality of output terminals corresponds to the plurality of divided areas.

Orito discloses separately outputting image signals of a plurality of divided areas (figure 8; figure 9; and column 6, lines 29-35 of Orito) of said plurality of photoreceptive pixels (column 5, lines 50-52 and lines 61-65 of Orito) from a plurality of output terminals corresponding to the plurality of divided areas (column 8, lines 48-53 of Orito). Image signals are placed in memory based on the particular block to which said signals correspond (column 8, lines 48-53 of Orito). In order to access said signals placed in memory, some form of output terminal is required. Since memory corresponding to a particular block of image data is accessed (column 8, lines 48-53 of Orito), said output terminals would therefore correspond to their associated divided area of the image.

Arimoto and Orito are combinable because they are from the same field of endeavor, namely scanned digital tone data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to process and adjust the image data based on said reference member, as taught by Arimoto, for each of a plurality of divided areas of an image, as taught by Orito. The motivation for doing so

would have been that each of a plurality of CCDs (column 1, lines 54-57 of Orito) has different electronic characteristics (column 1, lines 62-63 of Orito) and even a single CCD can produce different tone data values when the irradiation light intensity varies (column 1, lines 63-65 of Orito). Therefore, it is beneficial to obtain correction data from a plurality of divided areas (column 2, lines 21-23 of Orito). Therefore, it would have been obvious to combine Orito with Arimoto to obtain the invention as specified in claims 34, 35 and 36.

Regarding claims 2 and 18: Arimoto discloses that said adjustment unit adjusts the levels of the image signals output from said output terminals using look up tables (figure 1(112') and column 60-67 of Arimoto).

Regarding claims 3 and 19: Arimoto discloses that said adjustment unit adjusts the levels of the image signals output from said output terminals (column 10, lines 1-4 of Arimoto) using operation equations (column 9; equation 1, lines 24-25, lines 31-33, and lines 38-40 of Arimoto).

Regarding claims 7 and 23: Arimoto discloses a shading correction unit (figure 1(112') and column 5, lines 29-33 of Arimoto) wherein said adjustment unit (figure 1(106(portion)) of Arimoto) is arranged upstream to said shading correction unit, as can clearly be seen in figure 1 of Arimoto since the shading correction unit (figure 1(112') of Arimoto) is placed just before the video output.

Further regarding claims 9 and 25: Orito discloses separately outputting signals of a right-side divided area (WA1684) from signals of a left-side divided area (WA1) (figure 8 and column 8, lines 56-61 of Orito). WA1 is a divided area on the left

side and WA1684 is a divided area on the right side, as shown in figure 8 of Orito. Since the average white level values are used in correction calculations (column 9, lines 39-45 of Orito), it is inherent that said white level values are output.

Regarding claims 10 and 26: Arimoto discloses that said image sensor is a linear image sensor (column 4, lines 53-56 of Arimoto).

Regarding claims 11 and 27: Arimoto discloses that a plurality of said linear image sensors respectively corresponding to a plurality of colors are provided to form a color image sensor (column 19, line 65 to column 20, line 1 of Arimoto).

Regarding claims 13 and 29: Arimoto discloses that said reference density member (figure 3(301P) of Arimoto) is provided within the image sensing apparatus (column 6, lines 22-26 of Arimoto).

Regarding claims 14 and 30: Arimoto discloses a platen (figure 3(15) of Arimoto) for placing an original to be read (column 5, lines 40-43 of Arimoto), wherein said control unit controls said image sensor to read said reference density member (column 6, lines 41-43 of Arimoto) in a case where said reference density member is placed on said platen (column 6, lines 26-30 of Arimoto).

7. Claims 4-5 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto (US Patent 5,371,613) in view of Orito (US Patent 6,072,912) and Yamamoto (US Patent 5,526,048).

Regarding claims 4 and 20: Arimoto discloses that said adjustment unit adjusts the levels of the image signals output from said output terminals so as to substantially

match to the level of the predetermined reference signal (column 8, lines 1-5 of Arimoto) on the basis of data obtained by reading said reference density member by said image sensor (column 10, lines 1-4 of Arimoto).

Arimoto in view of Orito does not disclose expressly that said adjusting occurs while changing the accumulation period.

Yamamoto discloses adjusting image data by changing the accumulation period (column 4, line 62 to column 5, line 2 of Yamamoto).

Arimoto in view of Orito is combinable with Yamamoto because they are from the same field of endeavor, namely image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to change the accumulation period in order to affect the overall gain and white balance, as taught by Yamamoto. The motivation for doing so would have been to be able to adjust the image data directly with the CCD instead of requiring a separate analog signal adjustment circuit (column 6, lines 9-13 of Yamamoto). Therefore, it would have been obvious to combine Yamamoto with Arimoto in view of Orito to obtain the invention as specified in claims 4 and 20.

Regarding claims 5 and 21: Arimoto does not disclose expressly that said adjustment unit adjusts the levels of the image signals output from said output terminals on the basis of levels obtained by subtracting dark current level output during the accumulation period which is used for reading said reference density member from the levels of the image signals output from said output terminals.

Orito discloses subtracting the dark current level output during the accumulation period which is used for reading said reference density member (column 5, lines 55-58 of Orito) from the levels of the image signals out from said output terminals (column 5, lines 58-62 of Orito).

Arimoto and Orito are combinable because they are from the same field of endeavor, namely scanned digital tone data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to subtract the dark current level from the image signal levels, as taught by Orito. The motivation for doing so would have been to obtain the base black level upon which to produce the tonal gradations between black and white (column 5, lines 60-62 of Orito). Therefore, it would have been obvious to combine Orito with Arimoto to obtain the invention as specified in claims 5 and 21.

8. Claims 6, 12, 22 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto (US Patent 5,371,613) in view of Orito (US Patent 6,072,912) and Irie (US Patent 5,644,409).

Regarding claims 6 and 22: Arimoto discloses a shading correction unit (figure 1(112') and column 5, lines 29-33 of Arimoto).

Arimoto in view of Orito does not disclose expressly that said adjustment unit is arranged downstream to said shading correction unit.

Irie discloses a shading correction unit (figure 1(4) and column 5, lines 46-48 of Irie) that operates before the other image processing units, as can clearly be seen in

figure 1 of Irie, which adjust the shading corrected image signal based on other criteria (column 5, lines 54-55 and column 6, lines 1-6 of Irie).

Arimoto in view of Orito is combinable with Irie because they are from the same field of endeavor, namely digital image data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to place the shading correction unit before the other image processing units, as taught by Irie, one of said other image processing units being the adjustment unit taught by Arimoto. The motivation for doing so would have been to eliminate initial non-uniformities before further processing is performed (column 5, lines 47-53 of Irie). Therefore, it would have been obvious to combine Irie with Arimoto in view of Orito to obtain the invention as specified in claims 6 and 22.

Regarding claims 12 and 28: Arimoto in view of Orito does not disclose expressly that said image sensor is an area image sensor.

Irie discloses an area image sensor (figure 1(1) and column 5, lines 29-32 of Irie).

Arimoto in view of Orito is combinable with Irie because they are from the same field of endeavor, namely digital image data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use an area image sensor, as taught by Irie, for the image sensor taught by Arimoto. The motivation for doing so would have been to be able to read data two-dimensionally (column 5, lines 31-32 of Irie). Therefore, it would have been obvious to combine Irie with Arimoto in view of Orito to obtain the invention as specified in claims 12 and 28.

9. Claims 8 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto (US Patent 5,371,613) in view of Orito (US Patent 6,072,912), Irie (US Patent 5,644,409) and Yamada (US Patent 5,457,547).

Regarding claims 8 and 24: Arimoto discloses a shading correction unit (figure 1(112') and column 5, lines 29-33 of Arimoto) wherein said adjustment unit (figure 1(106(portion)) of Arimoto) is arranged upstream to said shading correction unit, as can clearly be seen in figure 1 of Arimoto since the shading correction unit (figure 1(112') of Arimoto) is placed just before the video output.

Arimoto in view of Orito does not disclose expressly a switch for changing a processing order of said adjustment unit and said shading correction unit.

Irie discloses a shading correction unit (figure 1(4) and column 5, lines 46-48 of Irie) that operates before the other image processing units, as can clearly be seen in figure 1 of Irie, which adjust the shading corrected image signal based on other criteria (column 5, lines 54-55 and column 6, lines 1-6 of Irie).

Arimoto in view of Orito is combinable with Irie because they are from the same field of endeavor, namely digital image data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have an additional arrangement wherein the shading correction unit is placed before the other image processing units, as taught by Irie, one of said other image processing units being the adjustment unit taught by Arimoto. The motivation for doing so would have been to eliminate initial non-uniformities before further processing is performed (column 5, lines

47-53 of Irie). Therefore, it would have been obvious to combine Irie with Arimoto in view of Orito.

Arimoto in view of Orito and Irie does not disclose expressly a switch for changing a processing order of said adjustment unit and said shading correction unit.

Yamada discloses a switch (figure 2(605) of Yamada) which selects which data is used for the shading correction (column 4, lines 1-6 of Yamada), and thus the overall image processing and correction.

Arimoto in view of Orito and Irie is combinable with Yamada because they are from the same field of endeavor, namely digital image data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a switch to determine which data is used for the image processing, as taught by Yamada. Said data to be selected is either the output of the arrangement wherein said adjustment unit is arranged upstream to said shading correction unit, as taught by Arimoto, or the output of the arrangement wherein said adjustment unit is arranged downstream to said shading correction unit, as taught by Arimoto in view of Orito and Irie. The motivation for doing so would have been to be able to provide the optimum shading correction depending on the received image data (column 2, lines 3-6 of Yamada). Therefore, it would have been obvious to combine Yamada with Arimoto in view of Orito and Irie to obtain the invention as specified in claims 8 and 24.

10. Claims 15-16 and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto (US Patent 5,371,613) in view of Orito (US Patent 6,072,912) and Usami (US Patent 5,960,110).

Regarding claims 15 and 31: Arimoto in view of Orito does not disclose expressly that the image sensing apparatus is connected to a printer and said reference density member is printed on said printer.

Usami discloses that the image sensing apparatus is connected to a printer (figure 5(20) and column 7, lines 28-30 of Usami) and a reference output condition, e.g. reference printing density, is printed (column 7, lines 40-43 of Usami).

Arimoto in view of Orito is combinable with Usami because they are from the same field of endeavor, namely scanned digital tone data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to connect said image sensing apparatus to a printer and print out a reference density, as taught by Usami, said reference density being the density of said reference density member taught by Arimoto. The motivation for doing so would have been to generate predictions for the corrected output conditions (column 7, lines 47-50 of Usami). Therefore, it would have been obvious to combine Usami with Arimoto in view of Orito to obtain the invention as specified in claims 15 and 31.

Further regarding claims 16 and 32: Usami discloses that an image sensing apparatus (figure 5 and column 7, lines 20-23 of Usami) is integrally configured with said printer (figure 5(20) of Usami), since said printer is used to generate the reference images based on the apparatus output conditions (column 7, lines 28-33 of Usami).

11. Claims 37-41, 44-46, 48-55, 57-58, 60, 62-66, 69-71, 73-80, 82-83 and 85-86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto (US Patent 5,371,613) in view of Orito (US Patent 6,072,912), Douglass (US Patent 5,542,031), and Sawada (US Patent 5,912,992).

Regarding claims 37, 62 and 86: Arimoto discloses an image sensing apparatus (figure 2 of Arimoto). Figure 1 and figure 3 of Arimoto show further details of said apparatus (column 3, lines 3-5 and lines 8-10 of Arimoto).

Said apparatus comprises an image sensor (figure 1(210) of Arimoto) which outputs image signals (column 4, lines 56-58 of Arimoto) of a plurality of photoreceptive pixels (CCD) from an output terminal (column 4, lines 53-56 of Arimoto).

Said apparatus further comprises a signal processing unit (figure 1(106(portion)) of Arimoto) for applying predetermined signal processing to the image signals output from said output terminal (column 6, lines 10-14 of Arimoto). The signal processing unit corresponds to the portion of the CPU, along with the corresponding embodied computer routines, that performs the functions of said signal processing unit.

Said apparatus further comprises a white board (figure 3(202) and column 6, lines 44-49 of Arimoto).

Said apparatus further comprises a control unit (figure 1(106(portion)) of Arimoto) for controlling to read a reference density member (figure 3(301P) and column 8, lines 59-67 of Arimoto) having a predetermined density of half tone (column 6, lines 42-43 of Arimoto). The control unit corresponds to the portion of the CPU, along with the

corresponding embodied computer routines, that performs the functions of said control unit.

Said apparatus further comprises an adjustment data acquisition unit (figure 1 (106(portion)) of Arimoto) for acquiring adjustment data for substantially matching levels of the image signals output from said signal processing unit to a first predetermined level (0.05) when said white board is scanned (column 7, lines 48-55 of Arimoto), and substantially matching levels of the image signals output from said plurality of signal processing units to a second predetermined level (0.1) when said reference density board is scanned (column 9, lines 52-56 and column 10, lines 1-4 of Arimoto).

Said apparatus further comprises an adjustment unit (figure 1(106(portion)) of Arimoto) for adjusting levels of image signals output from said signal processing unit using said adjustment data (column 9, lines 52-56 of Arimoto).

Further regarding claim 86, Arimoto discloses that the operations of said apparatus are performed using computer-readable program code (column 5, lines 20-23 of Arimoto).

Arimoto does not disclose expressly that said image sensor separately outputs image signals of a plurality of divided areas of said plurality of photoreceptive pixels from a plurality of output terminals corresponds to the plurality of divided areas; a plurality of signal processing units, respectively corresponding to the plurality of divided areas, for applying predetermined signal processing to the image signals output from said output terminals; and that adjustment data acquisition unit substantially matches levels of the image signals output from said plurality of signal processing units to a level

obtained by interpolating between said first and second predetermined levels when an image having a density other than the density of said white board and said reference density board is scanned.

Orito discloses separately outputting image signals of a plurality of divided areas (figure 8; figure 9; and column 6, lines 29-35 of Orito) of said plurality of photoreceptive pixels (column 5, lines 50-52 and lines 61-65 of Orito) from a plurality of output terminals corresponding to the plurality of divided areas (column 8, lines 48-53 of Orito). Image signals are placed in memory based on the particular block to which said signals correspond (column 8, lines 48-53 of Orito). In order to access said signals placed in memory, some form of output terminal is required. Since memory corresponding to a particular block of image data is accessed (column 8, lines 48-53 of Orito), said output terminals would therefore correspond to their associated divided area of the image.

Arimoto and Orito are combinable because they are from the same field of endeavor, namely scanned digital tone data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to process and adjust the image data based on said reference member, as taught by Arimoto, for each of a plurality of divided areas of an image using parallel image data processing, as taught by Orito. The motivation for doing so would have been that each of a plurality of CCDs (column 1, lines 54-57 of Orito) has different electronic characteristics (column 1, lines 62-63 of Orito) and even a single CCD can produce different tone data values when the irradiation light intensity varies (column 1, lines 63-65 of Orito). Therefore, it is

beneficial to obtain correction data from a plurality of divided areas (column 2, lines 21-23 of Orito). Therefore, it would have been obvious to combine Orito with Arimoto.

Arimoto in view of Orito does not disclose expressly that adjustment data acquisition unit substantially matches levels of the image signals output from said plurality of signal processing units to a level obtained by interpolating between said first and second predetermined levels when an image having a density other than the density of said white board and said reference density board is scanned; and a plurality of signal processing units, respectively corresponding to the plurality of divided areas, for applying predetermined signal processing to the image signals output from said output terminals.

Douglass discloses processing tiles of image data (figure 10(164,166) and column 9, lines 3-8 of Douglass) using parallel signal processors (column 9, lines 8-13 of Douglass). Therefore, the apparatus taught by Douglass comprises a plurality of signal processing units (column 9, lines 8-13 of Douglass), respectively corresponding to a plurality of divided areas (column 9, lines 3-8 of Douglass), for applying predetermined signal processing to the image signals (column 9, lines 20-25 of Douglass).

Arimoto in view of Orito is combinable with Douglass because they are from the same field of endeavor, namely image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to process the plurality of divided areas, taught by Orito, with a plurality of signal processing units, as taught by Douglass. The adjustment data would therefore also be acquired for the respective

signal processing units; and the levels of image signals output from said plurality of signal processing units would be adjusted. The motivation for doing so would have been to efficiently utilize system resources (column 9, lines 9-14 of Douglass). Therefore, it would have been obvious to combine Douglass with Arimoto in view of Orito.

Arimoto in view of Orito and Douglass does not disclose expressly that adjustment data acquisition unit substantially matches levels of the image signals output from said plurality of signal processing units to a level obtained by interpolating between said first and second predetermined levels when an image having a density other than the density of said white board and said reference density board is scanned.

Sawada discloses using interpolation to determine image data values that are not located at a sample point (column 4, lines 25-28 of Sawada).

Arimoto in view of Orito and Douglass is combinable with Sawada because they are from the same field of endeavor, namely image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use interpolation to interpolate image data values when said image data is between predetermined points, as taught by Sawada, said image data values being the image signal levels output from said plurality of signal processing units and said interpolation being performed by said adjustment data acquisition unit to match said levels that are between said first and second predetermined levels. The motivation for doing so would have been to improve the accuracy of the image pixel reproduction (column 2, lines 23-29 of Sawada). Therefore, it would have been obvious to combine Sawada with

Arimoto in view of Orito and Douglass to obtain the invention as specified in claims 37, 62 and 86.

Regarding claims 38 and 63: Arimoto discloses that said reference density member (figure 3(301P) of Arimoto) is provided within the image sensing apparatus (column 6, lines 22-26 of Arimoto).

Regarding claims 39 and 64: Arimoto discloses a platen (figure 3(15) of Arimoto) for placing an original to be read (column 5, lines 40-43 of Arimoto), wherein said control unit controls said image sensor to read said reference density member (column 6, lines 41-43 of Arimoto) in a case where said reference density member is placed on said platen (column 6, lines 26-30 of Arimoto).

Regarding claims 40 and 65: Arimoto discloses that at least one of the first and second predetermined levels is set in advance (column 6, lines 26-31 of Arimoto). The reference patch (figure 3(301P) of Arimoto) is set to a predetermined level (0.1) (column 6, lines 26-31 of Arimoto) and used as a reference for the shading correction (column 6, lines 42-43 of Arimoto).

Regarding claims 41 and 66: Arimoto does not disclose expressly that said first predetermined level is an average of signal levels obtained from said plurality of signal processing units when said white board is scanned.

Orito discloses a predetermined level (W1) (column 7, lines 45-50 of Orito) which is an average of signal levels obtained from said plurality of signal processing units when a white board is scanned (column 8, lines 50-57 of Orito).

Arimoto and Orito are combinable because they are from the same field of endeavor, namely scanned digital tone data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to scan said white board to obtain an average of signal levels to store as said predetermined level, as taught by Orito, said predetermined level being said first predetermined level taught by Arimoto. The motivation for doing so would have been to obtain the data needed to perform white level correction (column 4, lines 3-8 of Orito). Therefore, it would have been obvious to combine Orito with Arimoto to obtain the invention as specified in claims 41 and 66.

Regarding claims 44 and 69: Arimoto discloses that the signal level value for the reference member (figure 3(301P) of Arimoto) is uniform and unchanging over the area of said reference member (column 6, lines 38-43 of Arimoto). Therefore, said second predetermined level is an average of signal levels obtained from said plurality of signal processing units when said reference density board is scanned, since said average is equal to said uniform signal level value.

Regarding claims 45 and 70: Arimoto discloses that the signal level value for the reference member (figure 3(301P) of Arimoto) is uniform and unchanging over the area of said reference member (column 6, lines 38-43 of Arimoto). Therefore, said second predetermined level is a maximum of signal levels obtained from said plurality of signal processing units when said reference density board is scanned, since said maximum is equal to said uniform signal level value.

Regarding claims 46 and 71: Arimoto discloses that the signal level value for the reference member (figure 3(301P) of Arimoto) is uniform and unchanging over the

area of said reference member (column 6, lines 38-43 of Arimoto). Therefore, said second predetermined level is a minimum of signal levels obtained from said plurality of signal processing units when said reference density board is scanned, since said minimum is equal to said uniform signal level value.

Regarding claims 48 and 73: Arimoto discloses that said adjustment data acquisition unit acquires the adjustment data so that maximum levels of image signals obtained from said plurality of signal processing units become maximum levels after adjustment by said adjustment unit (column 10, lines 5-10 of Arimoto). After said adjustment by said adjustment unit (column 9, lines 52-56 and column 10, lines 1-4 of Arimoto), the output pixel values that are set to 255 (the maximum value for eight bits) based on the normalization with respect to the standard white plate density measurement (column 10, lines 5-10 of Arimoto).

Regarding claims 49 and 74: Arimoto in view of Orito and Douglass does not disclose expressly that the levels between said first and second predetermined levels are interpolated by a straight line.

Sawada discloses using interpolation to determine image data values that are not located at a sample point (column 4, lines 25-28 of Sawada), said interpolation being linear interpolation (column 4, lines 30-31 of Sawada).

Arimoto in view of Orito and Douglass is combinable with Sawada because they are from the same field of endeavor, namely image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use linear interpolation to interpolate image data values when said image data is between

predetermined points, as taught by Sawada, said image data values being the image signal levels output from said plurality of signal processing units and said linear interpolation being performed by said adjustment data acquisition unit to match said levels that are between said first and second predetermined levels. The motivation for doing so would have been to improve the accuracy of the image pixel reproduction (column 2, lines 23-29 of Sawada). Therefore, it would have been obvious to combine Sawada with Arimoto in view of Orito and Douglass to obtain the invention as specified in claims 49 and 74.

Regarding claims 50 and 75: Arimoto in view of Orito and Douglass does not disclose expressly that the levels between said first and second predetermined levels are interpolated by a curve.

Sawada discloses using interpolation to determine image data values that are not located at a sample point (column 4, lines 25-28 of Sawada), said interpolation being performed using a curve (column 4, lines 31-34 of Sawada).

Arimoto in view of Orito and Douglass is combinable with Sawada because they are from the same field of endeavor, namely image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use curve interpolation to interpolate image data values when said image data is between predetermined points, as taught by Sawada, said image data values being the image signal levels output from said plurality of signal processing units and said curve interpolation being performed by said adjustment data acquisition unit to match said levels that are between said first and second predetermined levels. The motivation for

doing so would have been to improve the accuracy of the image pixel reproduction (column 2, lines 23-29 of Sawada). Therefore, it would have been obvious to combine Sawada with Arimoto in view of Orito and Douglass to obtain the invention as specified in claims 50 and 75.

Regarding claims 51 and 76: Arimoto in view of Orito and Douglass does not disclose expressly that the interpolation is performed by operation.

Sawada discloses using interpolation to determine image data values that are not located at a sample point (column 4, lines 25-28 of Sawada), said interpolation being performed by operations, such as linear interpolation operations and curve interpolation operations (column 4, lines 30-34 of Sawada).

Arimoto in view of Orito and Douglass is combinable with Sawada because they are from the same field of endeavor, namely image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to perform the interpolation using operations, as taught by Sawada. The motivation for doing so would have been to improve the accuracy of the image pixel reproduction (column 2, lines 23-29 of Sawada). Therefore, it would have been obvious to combine Sawada with Arimoto in view of Orito and Douglass to obtain the invention as specified in claims 51 and 76.

Regarding claims 52 and 77: Arimoto discloses that said adjustment data is in a form of a look up table (figure 1(112') and column 60-67 of Arimoto).

Further regarding claims 53 and 78: Orito discloses separately outputting signals of a right-side divided area (WA1684) from signals of a left-side divided area

(WA1) (figure 8 and column 8, lines 56-61 of Orito). WA1 is a divided area on the left side and WA1684 is a divided area on the right side, as shown in figure 8 of Orito. Since the average white level values are used in correction calculations (column 9, lines 39-45 of Orito), it is inherent that said white level values are output.

Regarding claims 54 and 79: Arimoto discloses that said image sensor is a linear image sensor (column 4, lines 53-56 of Arimoto).

Regarding claims 55 and 80: Arimoto discloses that a plurality of said linear image sensors respectively corresponding to a plurality of colors are provided to form a color image sensor (column 19, line 65 to column 20, line 1 of Arimoto).

Regarding claims 57 and 82: Arimoto discloses that each of said plurality of signal processing units includes an amplifier (figure 1(101) of Arimoto) for amplifying the image signal output from the output terminal (column 5, lines 1-2 of Arimoto).

Regarding claims 58 and 83: Arimoto discloses that each of said plurality of signal processing units includes an A/D converter (figure 1(102) of Arimoto) for converting the image signal output from the output terminal from an analog signal to a digital signal (column 5, lines 2-3 of Arimoto).

Regarding claims 60 and 85: Arimoto discloses that said reference density member has at least a portion of uniform density (column 6, lines 37-43 of Arimoto).

12. Claims 42-43, 47, 56, 67-68, 72 and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto (US Patent 5,371,613) in view of Orito (US Patent

6,072,912), Douglass (US Patent 5,542,031), Sawada (US Patent 5,912,992) and Irie (US Patent 5,644,409).

Regarding claims 42 and 67: The arguments regarding claims 41 and 66 are incorporated herein. Arimoto in view of Orito does not disclose expressly that said first predetermined level is a maximum of signal levels obtained from said plurality of signal processing units when said white board is scanned.

Irie discloses using the maximum (WMAX2) of the obtained signal levels (column 7, lines 26-30 of Irie) for performing white level correction (column 8, lines 22-25 of Irie).

Arimoto in view of Orito, Douglass and Sawada is combinable with Irie because they are from the same field of endeavor, namely digital image data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the maximum of the obtained signal levels, as taught by Irie, instead of the average, as taught by Orito. The motivation for doing so would have been to be able to perform white level correction for a case when the white board is not dirty as a whole, but partially dirty (column 8, lines 23-25 of Irie). Therefore, it would have been obvious to combine Irie with Arimoto in view of Orito, Douglass and Sawada to obtain the invention as specified in claims 42 and 67.

Regarding claims 43 and 68: The arguments regarding claims 41 and 66 are incorporated herein. Arimoto in view of Orito does not disclose expressly that said first predetermined level is a minimum of signal levels obtained from said plurality of signal processing units when said white board is scanned.

Irie discloses using the minimum (WMAX1) of the obtained signal levels (column 7, lines 21-25 of Irie) for performing white level correction (column 8, lines 15-21 of Irie).

Arimoto in view of Orito, Douglass and Sawada is combinable with Irie because they are from the same field of endeavor, namely digital image data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the minimum of the obtained signal levels, as taught by Irie, instead of the average, as taught by Orito. The motivation for doing so would have been to be able to perform white level correction for a case when the white board is not dirty (column 8, lines 16-17 of Irie). Therefore, it would have been obvious to combine Irie with Arimoto in view of Orito, Douglass and Sawada to obtain the invention as specified in claims 43 and 68.

Regarding claims 47 and 72: The limitations disclosed in claims 47 and 72 comprise the limitations disclosed in claims 42 and 67 and the limitations disclosed in claims 46 and 71. Therefore, the arguments regarding claims 42 and 67 and the arguments regarding claims 46 and 71 are incorporated herein.

Regarding claims 56 and 81: Arimoto in view of Orito, Douglass and Sawada does not disclose expressly that said image sensor is an area image sensor.

Irie discloses an area image sensor (figure 1(1) and column 5, lines 29-32 of Irie).

Arimoto in view of Orito, Douglass and Sawada is combinable with Irie because they are from the same field of endeavor, namely digital image data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art

to use an area image sensor, as taught by Irie, for the image sensor taught by Arimoto. The motivation for doing so would have been to be able to read data two-dimensionally (column 5, lines 31-32 of Irie). Therefore, it would have been obvious to combine Irie with Arimoto in view of Orito, Douglass and Sawada to obtain the invention as specified in claims 56 and 81.

13. Claims 59, 61 and 84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto (US Patent 5,371,613) in view of Orito (US Patent 6,072,912), Douglass (US Patent 5,542,031), Sawada (US Patent 5,912,992) and Usami (US Patent 5,960,110).

Regarding claims 59 and 84: Arimoto in view of Orito, Douglass and Sawada does not disclose expressly that the image sensing apparatus is connected to a printer and said reference density member is printed on said printer.

Usami discloses that the image sensing apparatus is connected to a printer (figure 5(20) and column 7, lines 28-30 of Usami) and a reference output condition, e.g. reference printing density, is printed (column 7, lines 40-43 of Usami).

Arimoto in view of Orito, Douglass and Sawada is combinable with Usami because they are from the same field of endeavor, namely scanned digital tone data correction. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to connect said image sensing apparatus to a printer and print out a reference density, as taught by Usami, said reference density being the density of said reference density member taught by Arimoto. The motivation for doing so would

have been to generate predictions for the corrected output conditions (column 7, lines 47-50 of Usami). Therefore, it would have been obvious to combine Usami with Arimoto in view of Orito, Douglass and Sawada to obtain the invention as specified in claims 59 and 84.

Further regarding claims 61: Usami discloses that an image sensing apparatus (figure 5 and column 7, lines 20-23 of Usami) is integrally configured with said printer (figure 5(20) of Usami), since said printer is used to generate the reference images based on the apparatus output conditions (column 7, lines 28-33 of Usami).

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A Thompson whose telephone number is 703-305-6329. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on 703-308-7452. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James A. Thompson
Examiner
Art Unit 2624

JAT
August 27, 2004

THOMAS D
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PRIMARY EXAMINER